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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Samuel Ray Locke

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TOLER & LARSON & ABEL L.L.P.
5000 PLAZA ON THE LAKE STE 265
AUSTIN, TX 78746

EXAMINER

MATTIS, JASON E

ART UNIT

PAPER NUMBER

2665

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/854,797	Applicant(s) LOCKE, SAMUEL RAY	
	Examiner Jason E Mattis	Art Unit 2665	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claims 6 and 12 are objected to because of the following informalities: Both claims contain the limitation "the plurality of nodes" twice. Neither claims 6 nor 12 nor the claims that 6 and 12 depend on have a prior mention of "a plurality of nodes". It is recommended that "the plurality of nodes" be changed to "the plurality of ports" in both claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 4-7, 10-13, 16, and 18-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Dai et al. (U.S. Pat. 6658016).

With respect to claim 1, Dai et al. discloses an efficient multiplexing method comprising receiving a message at a first of a plurality of ports **(See column 27 line 33 to column 29 line 10 and Figures 1, 9A, and 9B of Dai et al. for reference to receiving a packet location announcement message at a first port of a first switch of a plurality of switches containing a plurality of ports)**. Dai et al. also discloses that the message is associated with a destination **(See column 19 line 20 to column 20 line 39 and Figures 4A and 4B of Dai et al. for reference to the format of unicast and multicast packet location announcement messages containing destination ID fields that associate the message with a destination)**. Dai et al. further discloses that if the destination is the first of the plurality of ports, sending the message to the destination **(See column 27 line 51 to column 28 line 14 and Figure 9A of Dai et al. for reference to issuing a request to output a message to a destination when it is determined that the destination ID value matches the local device, as shown in steps 738a, 742a, and 744a)**. Dai et al. further discloses that if the destination is a designated distributor, associating with the message a destination identifier of the first of the plurality of ports and sending the message to the designated distributor through a switching fabric **(See column 14 lines 37-50, column 28 line 15 to column 29 line 10 and Figures 3A and 9B of Dai et al. for reference to if a destination ID of a packet is a multicast address or broadcast address, sending the message through a switching fabric to a multicast queue 242, which is a designated distributor)**. Dai et al. also discloses sending the message to the destination through the switching fabric if the destination is not the designated

distributor or the first port (**See column 27 line 51 to column 28 line 14 of Dai et al. and Figure 9A for reference to if the destination device ID does not match the local device, propagating the message to the destination, as shown in steps 738a and 740a).**

With respect to claim 7, Dai et al. discloses an efficient multiplexing system comprising a switching fabric (See column 6 lines 27-51 and Figure 1 of Dai et al. for reference to a packet switching fabric 10). Dai et al. also discloses that the fabric is operable to send a message to a designated distributor if a destination identifier matches a receiving port of a plurality of ports (See column 14 lines 37-50, column 28 line 15 to column 29 line 10 and Figures 3A and 9B of Dai et al. for reference to if a destination ID of a packet is a multicast address or broadcast address including the receiving port, sending the message through a switching fabric to a multicast queue 242, which is a designated distributor). Dai et al. further discloses a designated distributor coupled to the switching fabric (See column 14 lines 37-50 and Figure 3B of Dai et al. for reference to the multicast queue 242 being a part of a transfer switching device 12, which is a part of the switching fabric 10). Dai et al. also discloses a plurality of ports coupled to the switching fabric (See column 6 lines 27-51 and Figure 1 of Dai et al. for reference to the switching fabric 10 containing switching devices 12 each having 8 network ports 14). Dai et al. further discloses that each port is operable to receive a message at a receiving port of the plurality of ports (See column 27 line 33 to column 29 line 10 and Figures 1, 9A, and 9B of Dai et al. for reference to receiving a packet location announcement message at a

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receiving port of a first switch of a plurality of switches containing a plurality of ports). Dai et al. also discloses that the message is associated with a destination (**See column 19 line 20 to column 20 line 39 and Figures 4A and 4B of Dai et al. for reference to the format of unicast and multicast packet location announcement messages containing destination ID fields that associate the message with a destination**). Dai et al. further discloses that if the destination is the receiving port of the plurality of ports, sending the message to the destination (**See column 27 line 51 to column 28 line 14 and Figure 9A of Dai et al. for reference to issuing a request to output a message to a destination when it is determined that the destination ID value matches the local device, as shown in steps 738a, 742a, and 744a**). Dai et al. further discloses that if the destination is a designated distributor, associating with the message a destination identifier of the receiving port of the plurality of ports and sending the message to the designated distributor through a switching fabric (**See column 14 lines 37-50, column 28 line 15 to column 29 line 10 and Figures 3A and 9B of Dai et al. for reference to if a destination ID of a packet is a multicast address or broadcast address, sending the message through a switching fabric to a multicast queue 242, which is a designated distributor**). Dai et al. also discloses sending the message to the destination through the switching fabric if the destination is not the designated distributor or the receiving port (**See column 27 line 51 to column 28 line 14 of Dai et al. and Figure 9A for reference to if the destination device ID does not match the local device, propagating the message to the destination, as shown in steps 738a and 740a**).

With respect to claim 13, Dai et al. discloses data multiplexing logic comprising a switching fabric **(See column 6 lines 27-51 and Figure 1 of Dai et al. for reference to a packet switching fabric 10)**. Dai et al. also discloses that the fabric is operable to send a message to a designated distributor if a destination identifier matches a receiving node of a plurality of output nodes **(See column 14 lines 37-50, column 28 line 15 to column 29 line 10 and Figures 3A and 9B of Dai et al. for reference to if a destination ID of a packet is a multicast address or broadcast address including the receiving node, sending the message through a switching fabric to a multicast queue 242, which is a designated distributor)**. Dai et al. also discloses logic coupled to the switching fabric with the logic comprising the plurality of output nodes and the designated distributor node **(See column 6 lines 27-51, column 14 lines 37-50, and Figures 1 and 3B of Dai et al. for reference to the switching fabric 10 containing switching devices 12 each having 8 network ports 14, which are output nodes, and for reference to the multicast queue 242 being a part of a transfer switching device 12, which is a part of the switching fabric 10, meaning there is logic to control the connections between the ports and the queue)**. Dai et al. further discloses that logic is operable to receive a message at a receiving node of the plurality of output nodes **(See column 27 line 33 to column 29 line 10 and Figures 1, 9A, and 9B of Dai et al. for reference to receiving a packet location announcement message at a receiving node of a first switch of a plurality of switches containing a plurality of ports)**. Dai et al. also discloses that the message is associated with a destination **(See column 19 line 20 to column 20 line 39 and**

Figures 4A and 4B of Dai et al. for reference to the format of unicast and multicast packet location announcement messages containing destination ID fields that associate the message with a destination). Dai et al. further discloses that if the destination is the receiving node of the plurality of output nodes, sending the message to the destination **(See column 27 line 51 to column 28 line 14 and Figure 9A of Dai et al. for reference to issuing a request to output a message to a destination when it is determined that the destination ID value matches the local device, as shown in steps 738a, 742a, and 744a).** Dai et al. further discloses that if the destination is a designated distributor, associating with the message a destination identifier of the receiving node of the plurality of output nodes and sending the message to the designated distributor through a switching fabric **(See column 14 lines 37-50, column 28 line 15 to column 29 line 10 and Figures 3A and 9B of Dai et al. for reference to if a destination ID of a packet is a multicast address or broadcast address, sending the message through a switching fabric to a multicast queue 242, which is a designated distributor).** Dai et al. also discloses sending the message to another of the plurality of output nodes if the destination is not the designated distributor or the receiving node **(See column 27 line 51 to column 28 line 14 of Dai et al. and Figure 9A for reference to if the destination device ID does not match the local device, propagating the message to the destination, as shown in steps 738a and 740a).**

With respect to claim 4, Dai et al. discloses that if the destination is the designated distributor, retrieving forwarding data associated with the message with the forwarding data associated with the destination **(See column 14 lines 37-50 and**

Figure 3A of Dai et al. for reference to retrieving data for multiple destination port IDs, which is forwarding data associated with the destination, from a routing table 304). Dai et al. also discloses sending the message and at least a portion of the forwarding data to the designated distributor **(See column 14 lines 37-50 of Dai et al. for reference to copying the message including the destination addresses to the multicast queue 242).** Dai et al. further discloses sending the message from the designated distributor through the fabric to a plurality of destinations in the network using the forwarding data **(See column 14 lines 37-50 of Dai et al. for reference to distributing the data packet to selected ones of the transmit buffer queues 80 connected to the corresponding destination network ports from the multicast queue 242).**

With respect to claim 10, Dai et al. discloses that if the destination is the designated distributor, retrieving forwarding data associated with the message with the forwarding data associated with the destination **(See column 14 lines 37-50 and Figure 3A of Dai et al. for reference to retrieving data for multiple destination port IDs, which is forwarding data associated with the destination, from a routing table 304).** Dai et al. also discloses sending the message and at least a portion of the forwarding data to the designated distributor through the switching fabric **(See column 14 lines 37-50 of Dai et al. for reference to copying the message including the destination addresses to the multicast queue 242).** Dai et al. further discloses sending the message from the designated distributor through the fabric to a plurality of destinations in the network using the forwarding data **(See column 14 lines 37-50 of**

Dai et al. for reference to distributing the data packet to selected ones of the transmit buffer queues 80 connected to the corresponding destination network ports from the multicast queue 242).

With respect to claim 16, Dai et al. discloses that if the destination is the designated distributor, retrieving from a memory forwarding data associated with the message with the forwarding data associated with the destination (See column 14 lines 37-50 and Figure 3A of Dai et al. for reference to retrieving data for multiple destination port IDs, which is forwarding data associated with the destination, from a routing table 304, which is a memory). Dai et al. also discloses sending the message and at least a portion of the forwarding data to the designated distributor through the switching fabric (See column 14 lines 37-50 of Dai et al. for reference to copying the message including the destination addresses to the multicast queue 242). Dai et al. further discloses sending the message from the designated distributor through the fabric to a plurality of destinations in the network using the forwarding data (See column 14 lines 37-50 of Dai et al. for reference to distributing the data packet to selected ones of the transmit buffer queues 80 connected to the corresponding destination network ports from the multicast queue 242).

With respect to claims 5, 11, and 18, Dai et al. discloses that the associated data comprises a bit mask (See column 20 lines 6-39 and Figure 4B of Dai et al. for reference to the message containing destination device ID fields 436, 438, 440, and 442 each carrying a corresponding single bit indicative of whether a corresponding one of the devices 12 is designated as one of the destination

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devices of the multicast data packet, meaning that the destination ID fields act as a bit mask).

With respect to claims 6, 12, and 19, Dai et al. discloses that sending the message comprises one of the group consisting of broadcasting the message to all of the plurality of nodes and broadcasting the message to a designated portion of the plurality of nodes (See column 14 lines 37-50 of Dai et al. for reference to a packet having a destination address that is a multicast address, which means the message is broadcast to a designated portion of the plurality of ports, and for reference to a destination address that is a broadcast address, which means the message is broadcast to all ports).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 8, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dai et al. in view of Giles et al. (U.S. Pat. 5369752).

With respect to claims 2, 8, and 14, Dai et al. does not disclose that the plurality of ports is the sum of one and n and the switching fabric utilizes n-to-one multiplexing logic, wherein n is a multiple of two.

Giles et al., in the field of communications, discloses using n-to-one multiplexing logic in a switching device to switch bits in and out of output latches (**See column 7 lines 29-36 of Giles et al. for reference to using N-to-one multiplexers to switch bits to output latches**). Using n-to-one multiplexing logic has the advantage of allowing data from any device port to be switched and connected to any output port of the device thus allowing for a direct connection of data from input to output ports (**See column 7 lines 34-36 of Giles et al. for reference to this advantage**).

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Giles et al., to combine the use of n-to-one multiplexing logic, as suggested by Giles et al., with the system and method of Dai et al., with the motivation being to allow data from any device port to be switched and connected to any output port of the device thus allowing for a direct connection of data from input to output ports.

5. Claims 3, 9, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dai et al. in view of Garg et al. (U.S. Pat. 6584121).

With respect to claims 3, 9, and 15, Dai et al. does not disclose that the switching fabric comprises a non-blocking crossbar architecture.

Garg et al., in the field of communications, discloses using a switching fabric that comprises a non-blocking crossbar architecture (**See column 1 lines 11-39 of Garg et al. for reference to using a strictly non-blocking crossbar switch**). Using a non-blocking crossbar architecture has the advantage of guaranteeing that a connection path will be available between each input channel and each output channel without rearrangement of any existing connections among other ports (**See column 1 lines 19-22 of Garg et al. for reference to this advantage**).

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Garg et al., to combine the use of a non-blocking crossbar architecture, as suggested by Garg et al., with the system and method of Dai et al., with the motivation being to guarantee that a connection path will be available between each input channel and each output channel without rearrangement of any existing connections among other ports.

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dai et al. in view of Prasad et al. (U.S. Pat. 6275491).

With respect to claim 17, Dai et al. does not disclose that the designated distributor logic node, the switching fabric, and the plurality of output nodes utilize at least one field programmable gate array.

Prasad et al., in the field of communications, discloses using field programmable gate arrays in the switching fabric and other elements of a fast packet switch (**See column 5 line 54 to column 6 line 10 of Prasad et al. for reference to port**

processors, fabric slices and an arbiter being programmable and configurable devices such as field programmable gate arrays). Using field programmable gate arrays has the advantage of allowing a switch to be easily programmed or reprogrammed from a computer providing a more flexible switch **(See column 5 line 54 to column 6 line 10 for reference to this advantage).**

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Prasad et al., to combine the use of field programmable gate arrays, as suggested by Prasad et al., with the system and method of Dai et al., with the motivation being to allow a switch to be easily programmed or reprogrammed from a computer providing a more flexible switch.

7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dai et al. in view of Hariguchi (U.S. Pat. 6181698).

With respect to claim 20, Dai et al. does not disclose that the memory comprises a content-addressable memory.

Hariguchi, in the field of communications, discloses a routing table, memory, in a switch that uses a content-addressable memory **(See column 5 line 43 to column 7 line 20 of Hariguchi for reference to using a content-addressable memory to implement a routing table).** Using a content-addressable memory has the advantage of providing a fast routing table lookup by looking up multiple entries in parallel **(See column 5 lines 43-49 of Hariguchi for reference to this advantage).**

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Hariguchi, to combine the uses of a content-addressable memory, as suggested by Hariguchi, with the system and method of Dai et al., with the motivation being to provide a fast routing table lookup by looking up multiple entries in parallel.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason E Mattis whose telephone number is (571) 272-3154. The examiner can normally be reached on M-F 8AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read 'Huy D. Vu', with a long horizontal line extending to the right.

HUY D. VU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800